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Architecture for alternative pollinators
“Solitary bee series”

Solitary Bees and Bee Diversity

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What are solitary bees?
Bees are often thought of as social insects, complete with queen, workers, and drones as in honey bees. In fact, more than 90 % of the 25,000 bees species are non-social or solitary. The key differences between solitary and social bees, in addition to lacking a social structure, are that female solitary bees work alone to provide food (a mixture of pollen and nectar) for their offspring and to build their nest; once solitary bee eggs hatch there is no nursing of the young or contact between the adult female and her brood. After the nest is built and egg laying is complete the female dies and her offspring are left to fend for themselves. Well protected inside the nest, the offspring have all the food they need to complete development into an adult. The following spring or summer adults emerge from the nest and mate, thus completing the lifecycle.

Why are they interesting?
Bees and flowering plants are co-evolutionary and date back to the Cretatious period (approx. 100 million years). The landscape created by this long co-evolutionary run is what has made homosapiens and life on earth as we know it possible. In contrast, and to put things in perspective, homosapiens have only roamed the earth for 200.000 years.

Solitary bees play a significant role in pollination in the wild. Solitary bees also play an important role in the pollination of agricultural crops such as those crops for which honeybees are not well suited (e.g. clover). Solitary bees in genus *Osmia* are frequently used for pollinating fruit crops such as apples and blueberries. Recent declines in the populations of honeybees worldwide, has sparked a widespread interest in solitary bees as promising alternative pollinators in agriculture. The general public is also beginning to appreciate the value of these bees in nature and to provide the two basic resources solitary bees need to thrive: flowers and nesting habitat.

Where can you find them?
Solitary bees nest in the ground or in pre-established cavities, such as holes in plant stems or wood. In more urban areas they are found nesting in holes between bricks and other architectural structures. Above ground bees that nest in pre-existing holes are called cavity-nesters. Cavity-nesting bees are the most promising managed/agricultural pollinators because large populations can be maintained simply by providing an above ground manmade habitats such as a Habeetats nest.

Solitary bees are gentle.
One can easily observe solitary bees in close proximity. Solitary bees do no not sting unless crushed or squeezed. Because they do not make honey and have no colony to defend solitary bees are not aggressive. And unlike social bees, their sting is not known to elicit an allergic response. They are fascinating to watch, as the females work diligently bringing nesting materials and pollen and nectar to provision her brood back to the nest.

Helping solitary bees is easy!
The major threats to bee diversity and abundance are limited floral resources and habitat availability. You can help the bees by planting wildflowers and providing habitat. You can provide habitat for cavity-nesting and ground-nesting bees by placing manmade nests around your garden or home and by providing areas of soil that remain undisturbed and do not flood during heavy rainfalls.

Why is that Habeetat so big?
Agricultural systems require a high pollinator demand over a short blooming period. These systems are frequently monocultures, which provide limited floral resources after the blooming period of the crop is complete. In addition, the natural nesting sites for wild bees are limited and often destroyed in agricultural areas. Large nesting blocks such as the large Habeetats nest combined with planting wildflowers strips provides a stable, nesting habitat protected from the elements along with the floral resources needed to build up wild pollinator populations. Because solitary bees typically return to the nests they emerge from, populations increase rapidly from year to year.

How do Habeetats work?
Small and large Habeetats provide cavity-nesting solitary bees with a readily available habitat so that they can begin nest building as soon as they emerge. Habeetats are built to protect the bees from the elements, however, nests are best placed in sunny areas protected from wind and rain. The ideal placement is where the nest will receive morning and afternoon sun so that the bees can warm up and begin foraging early in the day. Nests must also bee secured tightly so that they do not sway in the wind.

What can you expect to find in the nests?
The diameter and the length of the holes in manmade nests are important for the determining the type of bee they will attract and for ensuring an equal male to female ratio. Cavity-nesting bees typically nest in holes that are approximately the same diameter as their bodies are wide. The diameter of Habeetats nests attracts bees such as *Osmia* species and *Megachile* species. *Osmia* species build the partitions between their brood cells out of mud and for this reason are commonly called Mason bees. *Megachile* species, also known as leafcutting bees, line their brood cells with circular pieces of leaves.

For information on how to manage soliatary bees
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